nucleus, or only in the nucleolus. Whether this was owing to actual chemical differences, or to the particular condition of excitation at the moment of death of the ganglion, could not be made out. This last suggestion is a very interesting one, and invites to further investigation. In regard to one important point, we cannot help thinking that the author is very obscure. He decides against any possibility of a specific energy in the separate visual elements from the fact, as we understand him,—there are, unfortunately, no plates—that a single cell of the inner nuclear layer is connected with several cells of the ganglionic layer. In the first place, this connection would seem to be a physical impossibility, from the fact that the number of cells in the inner nuclear layer is much greater than in the ganglionic layer. In the second place, absolutely nothing is said about the multiplicity of the connection between the inner and the outer nuclear layer. In the third place, is it quite certain that several different fibres may not preserve their continuity on going through a single ganglionic cell? C. L. F.

On the morphology of the compound eyes of Arthropods. S. WATASE. Studies from the Biological Laboratory, Johns Hopkins University, Baltimore. Vol. iv, No. 6, 1889. Plates XXIX—XXXV.

The author has made both a careful and extensive study of his subject. The paper opens with "a consideration of the *ommatidium* as the morphological unit of the compound eye in arthropods, just as each little circle of rods with a cone in its centre may be considered as the morphological unit of the 'mosaic layer' (Henle) of the human retina." The *ommatidium* in *Serolis*, which is first described, presents three strata of cells. The most superficial is designated *corneagen*, the next the *vitrella*, and the deepest the *retinula*. This last alone is sensory. Each of these cells secretes chitin or a chitinous substance on what is morphologically its outer surface. The cells are, therefore, homologous with the ectodermal cells covering the surface of the body, and the *ommatidium*, with its various specializations, is morphologically a pit in the ectoderm. With *Serolis* as a type, the *ommatidia* of *Talorchestia*, *Combarus*, *Homarus* and *Calinectes*, and a number of others, are found to agree in all essentials. The compound eye of *Limulus* is next described, and the very primitive conditions found in this ancient form are in harmony with the previous observations. The pits in *Limulus* are much less complete than in the other forms described, and the dioptric apparatus less perfect. In discussing the compounding of an eye from these *ommatidia*, the anatomical point is made that the nervous prolongations of the *retinulæ* first form an intricate plexus, and then take their course to the optic ganglia. From the physiological side, it is pointed out that all vision is punctate, whether it be the vertebrate or invertebrate eye which is the organ; and therefore, in considering the vision of a given arthropod, its fineness is measured to some extent by the size of the individual *ommatidia*, whereas the range depends on the number of these units, and the manner in which they are distributed, exposure of *ommatidia* over a spherical surface giving an eye with the widest range. In an appendix, it is stated that the eye-spots in *Asteridæ* agree in their essential structure with those of the arthropods. The paper contains much more of interest, which is, however, not in place here, but which helps to make it a most valuable contribution to our knowledge of the sense-organs.

On the descending degenerations which follow the lesions of the Gyrus marginalis and the Gyrus fornicatus in Monkeys. E. P. FRANCE. With an introduction by Professor Schäfer, F. R. S. Phil. Trans., vol. 180, (1889) B. pp. 331–354. 3 plates.

The brains used in this investigation were from animals that had been employed for physiological experiments by Prof. Schäfer, in conjunction